

Titles

Absentee Astronomy, *Leif J. Robinson*, 310
Adalberta Mystery, The, *Lutz D. Schmadel, Richard M. West, and Claus Madsen*, 33
Antebellum Observatory in Alabama, An, *Gene Byrd and Robert Mellown*, 113
ASA 1,000 and Color Too! *Dennis di Cicco*, 215
Astronomy at Armagh, *Michael A. G. Michaud*, 17
Astronomy on Ice, *J. Harvey, M. Pomerantz, and T. Duvall, Jr.*, December, 1982; correction to, 115
Astrophysics in Austin, *Hans C. Ohanian and Ronald A. Schorn*, 494
Australia's Bicentennial Bonanza, *David H. Smith*, 120
A0538 - 66: The Most Powerful X-ray Star, *Philip Charles*, 497
Beyond the Big Bang, *Alan MacRobert*, 211
"Big Ear" vs. Golfballs, *Leif J. Robinson*, 214
Center of Our Galaxy, The, *John Kraus*, 30
Chabot's Century of Science Education, *Martin E. Morrison, Allen B. Takahashi, and Kingsley W. Wightman*, 398
Challenge of Salyut 7, The, *J. Kelly Beatty*, 401
Crab's Mysterious Jet, The, 26

Daniel J. K. O'Connell, S. J. (1896-1982), *George V. Coyne, S. J. and Martin F. McCarthy, S. J.*, 320
Early Views from Landsat 4, 303
Ebenezer Henderson's Astronomical Clock, *John Edwards*, 500
Exploring the Martian Arctic, *Donald C. Parker, M. D., Charles F. Capen, and Jeff D. Beish*, 218
Founding of Kitt Peak, The, *Leo Goldberg*, 228
Giorgio Abetti (1682-1982), *Margherita Hack*, 27
Great Debate Revisited, The, *Robert W. Smith*, 28
How We Got Our "Arabic" Star Names, *Paul Kunitzsch*, 20
Inflationary Universe Lives? *David H. Smith*, 207
Infrared and Submillimeter Astronomy from Space, *Stephen E. Strom*, 312
Infrared Views of the Giant Planets, *David A. Allen*, 110
International Space Arena, The, *Kenneth Gatland*, October, 1982; correction to, 225
IUE Looks at the Algol Paradox, *M. J. Plavec*, 413
Long Thread of Danish Astronomy, The, *G. W. E. Beekman*, 487
M. K. Vainu Bappu: Pioneer Astronomer, *G. Swarup and V. R. Venugopal*, 137

New, Improved SETI, The, *J. Kelly Beatty*, 411
Night Sky from Salyut, The, *Serge Koutchmy and Guenadi M. Nikol'skij*, 23
Observing White-Light Flares, *Donald F. Neidig and Jacques M. Beckers*, 226
Planetarium in Central Mexico, *James Cornell*, 492
Planetary Game Plan, A, *J. Kelly Beatty*, 116
Related Galaxies with Different Redshifts? *Halton C. Arp*, 307
Return to the Moon, *Andrew Chaikin*, 493
Robert d'Escourt Atkinson (1898-1982), *R. Kent Honeycutt*, 417
San Diego's Adventure in Space, *Pamela D. Crooks*, 127
Sky-Gazers Almanac 1983, *Roger W. Sinnott*, 51
Space Astronomy on Videodisk, *Jay M. Pasachoff*, 32
Stone's Throw from the Planets, A, *Andrew Chaikin*, 122
Wethersfield Meteorite: The Odds Were Astronomical, *Dennis di Cicco*, 118
What Ever Happened to Bufo the Toad? *Anthony Drennan*, 316
X-ray Jets of Centaurus A and M87, The, *Eric D. Feigelson and Ethan J. Schreier*, 6

Authors

Abdul-Rahman, Mahmood, Popular Astronomy in Kuwait, 361
Adel, Arthur, letter, 397
Allen, David A., Infrared Views of the Giant Planets, 110
Armstrong, H. L., letter, 5
Arp, Halton C., Related Galaxies with Different Redshifts? 307
Baetens, Chris, and F. Kinnet, Equatorial Tracking with a Dobsonian, 85
Beatty, J. Kelly, Challenge of Salyut, The, 401
New, Improved SETI, The, 411
Planetary Game Plan, A, 116
Beckers, Jacques M., see Neidig, Donald F.
Beekman, G. W. E., The Long Thread of Danish Astronomy, 487
Beish, Jeff D., see Parker, Donald C., M.D.
Borst, Lyle B., letter, 5
Bortle, John E., Comet Digest, 99, 195, 291, 382, 476, 565
Boulet, Dan L., Making a Simple Chronograph, 369
Bourgeois, Jean, letter, 485
Bracher, Katherine, book review, 508
Briggs, John Wright, Trends from Recent Meetings, 72
Buckley, Robert G., letter, 109
Bullen, M. A., letter, 397
Buta, Ronald J., book review, 330
Byrd, Gene, and Robert Mellown, An Antebellum Observatory in Alabama, 113
Capen, Charles F., see Parker, Donald C., M.D.
Cesarone, Robert J., letter, 301
Chaikin, Andrew, Changing Face of Mars, The, 470
Return to the Moon, 493
Stone's Throw from the Planets, A, 122
Chapman, Clark R., letter, 109
Charles, Philip, A0538 - 66: The Most Powerful X-ray Star, 497
Cobaugh, Stephen M., letter, 5
Cornell, James, A Planetarium in Central Mexico, 492
Coyne, George V., S. J., and Martin F. McCarthy, S. J., Daniel J. K. O'Connell, S. J. (1896-1982), 320

Crooks, Pamela D., San Diego's Adventure in Space, 127
Cruikshank, Dale P., letter, 485
see also Osterbrock, Donald E.
Daley, James A., Jr., The Schupmann Club, 278
Davidson, G. T., book review, 237
DelVo, Pierino, Astrophotography with a Small Refractor, 537
di Cicco, Dennis, ASA 1,000 and Color Too! 215
Wethersfield Meteorite: The Odds Were Astronomical, 118
Dick, Steven J., letter, 301
Doggett, LeRoy E., and George H. Kaplan, letter, 205
Dorst, Friedhelm, letter, 397
Drennan, Anthony, What Ever Happened to Bufo the Toad? 316
Dunham, David W., Occultation Highlights for the Year 1983, 92 (correction, 285)
Planetary Occultations of Stars in 1983, 58
Dunham, David W., and Paul Maley, Pallas Occultation: A Rare Spectacle, 440
Duvall, T., Jr., see Harvey, J.
Ebdon, John, letter, 302
Edwards, John, Ebenezer Henderson's Astronomical Clock, 500
Esquivel-Sirvent, Raul P., Summer Opportunities for Students, 264
Feigelson, Eric D., and Ethan J. Schreier, The X-ray Jets of Centaurus A and M87, 6
Fraknoi, Andrew, letter, 206
Franko, John M., letter, 397
Ganoe, William H., letter, 486
Gatland, Kenneth, The International Space Arena, October, 1982; correction to, 225
Giller, Roger, letter, 302
Gilmore, Michael R., letter, 405
Gingerich, Owen, Astronomical Scrapbook, 124, 418
book review, 39
Gingrich, Mark, letter, 405
Goldberg, Leo, The Founding of Kitt Peak, 228
Gottschalk, Gert, An Amateur Solar Telescope, 81
Greenstein, Jesse L., letter, 206
Gurley, Robert E., letter, 206

Hack, Margherita, book review, 510
Giorgio Abetti (1882-1982), 27
Harvey, J. M., Pomerantz, and T. Duvall, Jr., Astronomy on Ice, December, 1982; correction, 115
Henden, Arne, see Kaitchuck, Ronald
Hochgraf, Lester, letter, 405
Honeycutt, R. Kent, Robert d'Escourt Atkinson (1898-1982), 417
Houston, Walter Scott, Deep-Sky Wonders, 96, 188, 284, 379, 472, 563
Hutchinson, Michael J., letter, 302
Joka, Herbert J., letter, 206
Kaitchuck, Ronald, and Arne Henden, letter, 485
Kamper, Karl, book review, 37
Kaplan, George H., see Doggett, LeRoy E.
Kemp, James C., book review, 239
Kinnet, F., see Baetens, Chris
Knox, Reed, Jr., letter, 206
Koutchmy, Serge, and Guenadi M. Nikol'skij, The Night Sky from Salyut, 23
Kraus, John, The Center of Our Galaxy, 30
Kriszianus, Kevin, book review, 426
Kunitzsch, Paul, How We Got Our "Arabic" Star Names, 20
Lankford, John, book review, 140
Lawless, James G., see Tarter, Jill C.
Loader, Brian, letter, 301
London, Jim, letter, 5
Lovi, George, Rambling Through . . . (current month) Skies, 49, 151, 247, 343, 435, 521
MacRobert, Alan, Beyond the Big Bang, 211
Lesser Lights, The, 530
Outer Limits, The: How Far Can You See? 348
Madsen, Claus, see Schmadel, Lutz D.
Maley, Paul, see Dunham, David W.
Mandler, Rudolf, A Portable Platform for Astrophotography, 366
Marshall, Laurence A., book review, 423
Martin, Leonard J., Mars from Earth and Space, 559
Masthay, Carl, letter, 205
McCarthy, Martin F., S. J., see Coyne, George V., S. J.
Meus, Jean, letters, 5, 301
Mellown, Robert, see Byrd, Gene
Merz, Rainer, see Wolter, Christian

- Michaud, Michael A. G., *Astronomy at Armagh*, 17
 Mihalas, Dimitri, book review, 142
 Morrison, David, book review, 35
 Morrison, Martin E., Allen B. Takahashi, and Kingsley W. Wightman, *Chabot's Century of Science Education*, 398
 Moyer, Gordon, book review, 512
 Moser, Philip, letter, 205
 Murray, Alasdair M., letter, 205
 Muzzio, Juan C., letter, 115
 Neidig, Donald F., and Jacques M. Beckers, *Observing White-Light Flares*, 226
 Nightingale, Stephen, *Astronomy Education Without a Budget*, 359 (correction, 539)
 Nikolskij, Guenadi M., see Koutchmy, Serge
 O'Brien, Kennedy J., M.D., letter, 485
 Ohanian, Hans C., and Ronald A. Schorn, *Astrophysics in Austin*, 494
 Osterbrock, Donald E., and Dale P. Cruikshank, letter, 109
 Oris, Michael G., *An Observatory with a Voice*, 548
 Page, Thornton, book review, 334
 Parker, Donald C., M.D., Charles F. Capen, and Jeff D. Beish, *Exploring the Martian Arctic*, 218
 Pasachoff, Jay M., book review, 234
 Space Astronomy on Videodisk, 32
 Paul, E. Robert, book review, 139
 Pearce, G. S., book review, 40
 Plavec, M. J., *IUE Looks at the Algol Paradox*, 413
 Pomerantz, M., see Harvey, J.
 Porter, Alain, book review, 336
 Powell, Conley, letter, 302
 Rizzo, Patrick V., book review, 41
 Robertson, Donald F., book review, 235
 Robinson, Leif J., *Absentee Astronomy*, 310
 "Big Ear" vs. Golfballs, 214
 book review, 38
 Supergiant Stars and Visual Observers, 156
 Rosyadi, Hidayatullah, letter, 109
 Salmi, Juhani, *A Finnish Observatory*, 262
 Savio, Jorge Balseiro, *South American League*, 264
 Schmadel, Lutz D., Richard M. West, and Claus Madsen, *The Adalberto Mystery*, 33
 Schorn, Ronald A., see Ohanian, Hans C.
 Schreier, Ethan J., see Feigelson, Eric D.
 Seal, David, *Astronomy in Egypt: A Monument for Alexandria*, 168
 Seeds, Michael A., letter, 486
 Seidelmann, P. Kenneth, letter, 301
 Sheldon, Eric, letter, 205
 Simmons, Michael, *The Mount Wilson Observatory Association*, 453
 Sinnott, Roger W., *Readers Gauge the Umbra Again*, 387
 Sky-Gazers Almanac 1983, 51
 Telescope Making and Robotics — A Look Back, 552
 Smith, D. H., *Australia's Bicentennial Bonanza*, 120
 Inflationary Universe Lives? The, 207
 Smith, Robert W., *The Great Debate Revisited*, 28
 Sorensen, Brent, *An Objective-Prism Spectrograph*, 460

- Stoltzmann, David E., *Resolution Criteria for Diffraction-Limited Telescopes*, 176
 Stone, Dennis, letter, 109
 Space Advocacy Movement, The, 452
 Stone, Remington P. S., letter, 301
 Strom, Stephen E., *Infrared and Submillimeter Astronomy from Space*, 312
 Swarup, G., and V. R. Venugopal, M. K. Vainu Bappu, *Pioneer Astronomer*, 137
 Takahashi, Allen B., see Morrison, Martin E.
 Tarter, Jill C., and James G. Lawless, book review, 331
 Taylor, J. G., book review, 513
 Trombino, Don, book review, 144
 van Ellinckhuysen, Jack, *Correcting the Eye's Astigmatism*, 465
 Venugopal, V. R., see Swarup, G.
 Victor, Robert C., *Sun, Moon, and Planets This Month*, 56, 154, 250, 346, 438, 528
 Washburn, Mark, book review, 234
 Weissman, Paul R., book review, 422
 Weitzenhoffer, Kenneth, letter, 405
 West, Richard M., see Schmadel, Lutz D.
 Wightman, Kingsley W., see Morrison, Martin E.
 Willson, Lee Anne, book review, 424
 Wilson, Allan, letter, 486
 Wilson, Raymond H., Jr., letters, 109, 486
 Wolter, Christian, and Rainer Merz, *The Neglected Schupmann Refractor*, 273
 Worden, Simon P., letter, 397

Departments and Features

Amateur Astronomers —

- Amateur Briefs*, 73, 264, 361
Astronomy Education Without a Budget, 359 (correction, 539)
Astronomy in Egypt: A Monument for Alexandria, 168
Astrophotography with a Small Refractor, 537
Finnish Observatory, A, 262
Mount Wilson Observatory Association, The, 453
Popular Astronomy in Kuwait, 361
South American Amateur Observatory, 361
South American League, 264
Space Advocacy Movement, The, 452
Summer Opportunities for Students, 264
Three Award Winners, 74
Trends from Recent Meetings, 72
Upcoming Meetings, 74, 359, 539

Astronomical Scrapbook —

- Ancient Egyptian Sky Magic*, 418
Great Comet That Never Came, The, 124

Books and the Sky —

- Antimatter Propulsion*, A. R. Martin, editor, 235
Astronomical Photometry, Arne A. Henden and Ronald H. Kaitchuck, 239
Book of Calendars, The, Frank Parise, editor, 512
B-Stars With and Without Emission Lines, Anne Underhill and Vera Doazan, editors, 142
Bright Star Catalogue, The, Dorrit Hoffleit with Carlos Jaschek, 237
Cambridge Encyclopedia of Earth Sciences, The, David G. Smith, editor, 234
Cosmic Serpent, The, Victor Clube and Bill Napier, 422
Early Emission Line Stars, C. R. Kitchen, 513
Exploring the Earth and the Cosmos, Isaac Asimov, 41
History of Modern Astronomy and Astrophysics, The: A Selected, Annotated Bibliography, David H. DeVorkin, 140
Lighter Side of Gravity, The, Jayant Narlikar, 513
Meeting with the Universe, A. Bevan M. French and Stephen P. Maran, editors, 35
Mission to Mars, James Oberg, 334
Mysterium Cosmographicum: The Secret of the Universe, Johannes Kepler, 39
Nature of Symbiotic Stars, The, Michael Friedjung and Roberto Viotti, editors, 424
Observational Astronomy for Amateurs, J. B. Sidgwick, 40

- Other Worlds*, Paul Davies, 38
Photoelectric Photometry of Variable Stars, Douglas S. Hall and Russell M. Genet, 239
Plurality of Worlds, Steven J. Dick, 139
Radiative Processes in Astrophysics, George B. Rybicki and Alan P. Lightman, 336
Searching Between the Stars, Lyman Spitzer, Jr., 423
1769 Transit of Venus, The, Doyce B. Nunis, Jr., editor, 508
Software for Photometric Astronomy, Silvano Ghedini, 426
Space, James A. Michener, 234
Space Travellers: The Bringers of Life, Fred Hoyle and Chandra Wickramasinghe, 331
Stellar Paths, Peter van de Kamp, 37
Unfolding Universe, The, Patrick Moore, 144
Webb Society Deep-Sky Observer's Handbook, Vol. 5: *Clusters of Galaxies*, Kenneth Glyn Jones, editor, and George S. Whiston, 330

Celestial Calendar —

- Asteroid Notes*, 350
Asteroid Occultation Reminder, 532
Guide to the Outer Solar System, A, 61
Jovian Moons Bunch, 532
June's Partial Lunar Eclipse, 531
Lesser Lights, The, 530
Meteors, 62, 383
Minima of Algol, 62, 158, 254, 350, 442, 532
Moon Occults Jupiter, 350
Occultation Reminder, 158
Outer Limits: The How Far Can You See?, 348
Pallas Occultation: A Rare Spectacle, 440
Planetary Occultations of Stars in 1983, 58
Pluto Occultation Alert, 349
R Leonis at Maximum, 252
Supergiant Stars and Visual Observers, 156
Variable Star Maxima, 62, 158, 254, 347, 442, 532

50 and 25 Years Ago, 16, 136, 210, 302, 417, 486

Front-cover photographs —

- al-Sufi's Perseus, 1
 Chabot's Transit Room, 393
 December's Dusky Eclipse, 201
 Mauna Kea Moorset, 481
 Outer Space House Guest, 105
 Spiral Galaxy NGC 1232, 297

Cleanings for ATM's —

- Amateur Solar Telescope*, An, 81
Correcting the Eye's Astigmatism, 465
Equatorial Tracking with a Dobsonian, 85

- Making a Simple Chronograph*, 369
Neglected Schupmann Refractor, The, 273
Objective-Prism Spectrograph, An, 460
Observatory with a Voice, An, 548
Portable Platform for Astrophotography, A, 366
Resolution Criteria for Diffraction-Limited Telescopes, 176
Schupmann Club, The, 278
Telescope Making and Robotics — A Look Back, 552

Letters, 5, 109, 205, 301, 397, 485

New Books Received, 42, 145, 241, 337, 428, 513

News Notes —

- Ancient Solar Observatory?* 11 (correction, 509)
 ... And the Large Magellanic Cloud as Well, 224
Are Quasars Nearby? 322
Asteroid Classes: Alphabet Soup, 326
Asteroid Grant, 14
AURA's Triple Celebration, 406
Aurora Urani? 11
Better Black Hole? A, 221
Binary Pulsar, The — A Textbook Example, 325
Case of PG 1159 — 035: A New Type of Variable Star, 506
Center of M31, The, 325
Changes in Earth's Tilt, 12
Chrétien Award, 222
Circinus X-1: More Bewildering Than Ever, 13
Clumpy NGC 7673, 324
Cygnus X-1: The Longest-Period Celestial X-ray Source, 221
Doppler Imaging of Starspots, 132
Educational Opportunity, 324
Farewell to a Space Pioneer, 328
First Images from the IRAS Telescope, 322
FK Comae: A Coalescing Binary System? 323
Former Managing Editor Dies, 507
Getting a Job in Astronomy, 505
Globular Cluster's Central Core, A, 13
Gould's Belt and the Local Gas Ring, 135
Gravitinos Explain Lumpy Universe, 16
High-Redshift Galaxies, 133
Horizon-to-Horizon Supercluster, The, 505
Losing the Martian Connection, 321
M8: An Active Star-Forming Region, 502
Millisecond Pulsar Puts Astronomers in a Spin, 131
Moon's Ancient Magnetism, The, 506
MR 2251 — 178: A Quasar Weighs In, 503
New AAVSO Report, 407
New Comet Halley Photograph, 222
New Gallery at NASM, 507

New Power for VLBI, 409
 Next DPS Meeting, 410
 Next Year's Explosion of VY Aquarii? 407
 1983a Doesn't Exist, 408
 Nitrogen-Rich Novae: Are We Breathing Their Shells? 408
 Oldest "Old Nova," The, 12
 On the Trail of the Crab, 504
 Ordinary Nova Remnants: Oblate or Prolate? 224
 P/Giacobini-Zinner, Ho! 135
 Pioneer 10: Beyond the Known Planets, 507
 Problom Paydirt, 324
 Quasar Near Edge of Universe, 14
 Rejuvenated Quasars? 409
 Ring Nebula Update, 133 (correction, 426)
 Search for Gravitational Radiation Continues, 131
 SETI Manifesto, 12
 Slowest Spinning Asteroids, The, 504

Spaghetti Universe, The, 410
 Stalking the W Particle, 406
 Star Formation in Bok Globules, 130
 3C 324: Most Distant Galaxy, 321
 Tycho, Kepler, and Einstein . . . 223
 Volcanoes on Europa? 15
 Water Ice Detected in Comet Bowell, 134
Observer's Page —
 Changing Face of Mars, The, 470
 Comet Digest, 99, 195, 291, 382, 476, 565
 December's Partial Solar Eclipse, 290
 Deep-Sky Wonders, 96, 188, 284, 379, 472, 563
 Mars from Earth and Space, 559
 More on December's Lunar Eclipse, 383
 1982's Lunar Eclipses: Round 3, 287
 Observers' Notebook, 191, 560
 Occultation Highlights for the Year 1983, 92 (correction, 285)

Pluto's Near Miss, 559
 Readers Gauge the Umbra Again, 387
 Spectacular Rocket Launch, 472
 Sunspot Numbers, 98, 190, 285, 381, 475, 564
Rambling Through . . . (current month) Skies, 49, 151, 247
 Cosmic Clusters Large and Small, 435
 Stalking the Mighty Lion, 343
 What's "Official" in the Sky? 521
Southern Stars, 48, 246, 434
Stars for . . . (current month), 50, 152, 248, 344, 436, 522
Sun, Moon, and Planets This Month, 56, 154, 250, 346, 438, 528
 Jupiter's Satellites, 57, 155, 251, 347, 439, 529
 Moon Phases and Distances, 57, 158, 251, 347, 439, 529

Selected Topics and Celestial Objects

This listing is not intended to be exhaustive and does not supplant the other parts of the index. For example, material in such regular features as Books and the Sky is ordinarily indexed only under the Departments and Features section.

Amateur astronomy: AAVSO meeting, 72; *AAVSO Report*, 407; high-speed photometry, 361; IOTA, 440; IUAIA-IAU alliance, 485; Mount Wilson Observatory Association, 453; opportunities for students, 264; Problom nova, 324; Schupmann Club, 278; South American League, 264; space advocacy groups, 452; Venezuelan, 73; worldwide radio program, 264
 Asteroids: Adalberto mystery, 33; Beatrix, 532; designations, 301; distribution from Sun, 328; grant to study near-Earth, 14; Juno, 532; Metis, 193; Pallas occultation, 440; review of classes, 326; slowest-spinning, 504; stereo photography of, 397
 Astrometry: *Carte du Ciel*, 301; stellar parallaxes by Voyager, 301; visual with homemade chronograph, 369
 Awards: Amateur Achievement, 74; David Gill medal, 74; G. B. Blair medal, 74; Henri Chrétien, 222
 Black holes: candidate observed, 221; opeonautics, 205
 Clusters: clustering throughout universe, 435, 505; extragalactic star clusters, 115. Globular — Omega Centauri, 475; M10, 563; M12, 563; M13, 564; NGC 6397, 13. Open — M36, 97; M37, 96, 98; M38, 96; M44, 188; M48, 190; M67, 189; NGC 1664, 96; NGC 1778, 96; NGC 1857, 96; NGC 1883, 96; NGC 2192, 98; NGC 2658, 190; NGC 6530, 502
 Comets: predicted return in 1857, 124; water ice in 1980b, 134; P/Churyumov-Gerasimenko, 99, 195; P/Crommelin, 99; P/d'Arrest, 195, 565; P/Giacobini-Zinner, 135; P/Halley, 151, 222; P/Kopff, 99, 477, 565; P/Tempel 1, 99, 382, 565; P/Tempel 2, 99, 476, 565; of 1264, 124; of 1556, 124; Great March, 18431, 291; Donati, 1858 VI, 126; Churyumov, 1970n, 409; Helin-Dunbar, 1980p, 409; Austin, 1982g, 99, 195; 1983a doesn't exist, 408
 Cosmology: Big Bang, 211, 494; gravitinos' role, 16; inflationary universe, 207, 494; Shapley-Curtis debate, 28; strings of galaxy clusters, 410
 Double and multiple stars: Castor, 189; close binaries triggering novae, 224; FK Comae as binary, 323; some interesting, 435; X-ray binary, 497
 Eclipses: Dec. 15, 1982, solar, 290; Dec. 30-31, 1982, total lunar, 287, 383, 387, 485; June 11, 1983, total solar, 205, 528; June 24-25, 1983, lunar, 531
 Education: at Chabot, 398; by an amateur, 206; in Kuwait, 361; opportunities, 264, 324; videodisk, 32; without an astronomy budget, 354
 Galaxies: active, 496; among stars of M44, 189; burst of star formation in NGC 7673, 324; Centaurus A, 6, 475; center of M31, 325; distant bright, 350; distant emission-line galaxies, 133; in strings of clusters, 410; largest supercluster of, 505; most distant normal, 321; observable in binoculars, 349; related with different redshifts, 307; Virgo Cloud, 435, 563; M31, 325; M33, 309; M51, 472; M63, 474; M87, 6, 301; M95, 285; M96, 285; M105, 285; NGC 1232, 299; NGC 3003, 284; NGC 3021, 284; NGC 3130, 285; NGC 3166, 285; NGC 3588, 474; NGC 3605, 474; NGC 3607, 285, 474; NGC 3608, 285, 474; NGC 3626, 475; NGC 3634, 380; NGC 3635, 380; NGC 3637, 380; NGC 3672, 380; NGC 3732, 380; NGC

3887, 379; NGC 4036, 284; NGC 4041, 284; NGC 4319, 322; NGC 4605, 284; NGC 5195, 473; NGC 5198, 474; NGC 5962, 563; NGC 6070, 563; NGC 6118, 564; NGC 6196, 564; NGC 6199, 564; NGC 6207, 564
 High-energy astronomy: Circinus X-1, 13; Cygnus X-1, 221; first quasar discovered by X-rays, 503; gamma-ray bursters, 496; most powerful X-ray star, 497; of supernova remnants, 223, 224; X-ray binary, 497; X-ray jets in galaxies, 6; X-ray source as black hole, 221
 History: ancient Egyptian astronomy, 418; ancient solar observatory, 11; Armagh Observatory, 17; *Astrophysical Catalogue*, 301; California's first observatory refractor, 486; Chabot Observatory, 398; Danish astronomy, 487; discovery of JX and JXI, 109; discovery of M87 jet, 301; Great Debate, 28; Henderson astronomical clock, 500; Kitt Peak's founding, 228; McMath-Hulbert Observatory, 231; models of the solar system, 5; Mount Wilson interferometers, 486; predicted return of comet in 1857, 124; star names, 20; studies of Earth's upper atmosphere, 206; transits of Venus, 405; University of Alabama Observatory, 113; Woodstock College Observatory, 205
 Infrared astronomy: from space, 312; of giant planets, 110; review of, 315
 Jupiter: infrared views, 110; JX and JXI, 109; volcanoes on JII, 15
 Life, extraterrestrial: search for, 12, 411
 Mars: changing features of, 470; photographs of Martian cloud, 559; polar cap, 218
 Meteorites: from Moon, 122; Wethersfield fall, 118
 Moon: ancient magnetism, 506; return to, 493; role in Earth's obliquity, 12
 NASA: funding, 109; future lunar program, 493; planetary science plans, 116
 Nebulae: Crab, 26, 504; Gum, 130; ring H II regions, 133. Diffuse — M8, 502; NGC 1931, 97, 98. Planetary — NGC 4361, 381
 Neptune: infrared views, 112
 Observatories: Armagh, 17; Brorfelde, 489; Cloudfroft, 397; European Southern, 490; Kitt Peak, 406; Kotamia, 168; La Palma, 491; McMath-Hulbert, 231; Mount Wilson, 453; Ostervold, 488; remotely operated, 310; Römer, 489; Round Tower, 487; Schumacher's, 488; Stuttgart-Pfaffenwald, 273; Tusculaneum, 488, 490; University of Alabama, 113; Vatican, 320; Woodstock College, 205
 Observatories, amateur and public: Aberdeen, S. D., 548; Argentine, 361; Chabot, 398; computer-controlled, 548; Finnish, 262; Schodack, N. Y., 359
 Personal notes: Abetti, G., 27; Atkinson, R. d'Escourt, 417; Bappu, M.K.V., 137; Dawes, W. R., 180; Federer, H. S., 507; Ham, the chimpanzee astronaut, 328; Henderson, E., 500; Kozyrev, N. A., 485; McMath, R., 231; O'Connell, D. J. K., 320
 Photography: ASA 1,000 color film, 215; astrophotographer's *Desiderata*, 560; Jupiter over mountain horizon, 561; portable drive platform, 366; stereo, 397; with a small refractor, 537

Planetariums: Armagh, 302; Fleet Space Theater, 127; London, 302; Morelia, 492
 Pluto: appulses in April, 349, 559
 Pulsars: binary pulsar A0538-66, 499; binary PSR 1913+16, 325, 495; with millisecond period, 131, 495
 Quasars: are they nearby? 322; brightest high-redshift, 350; interacting with galaxies, 307, 409, 503; mass of system MR 2251-178, 503; most distant and luminous, PKS 2000-330, 14
 Radio astronomy: Australia Telescope, 120; "Big Ear" threatened, 214; discovery of galaxy supercluster, 505; map of central galactic region, 30; radio galaxies, 6; very-long-baseline interferometry, 409
 Saturn: A-ring details, 109; infrared views, 112
 Space and spacecraft: Advanced X-ray Astrophysical Facility, 315; Cosmic Background Explorer, 314; Einstein Orbiting Observatory, 223, 224; health in space, 403; HEAO, 497; Interplanetary Sun-Earth Explorer, 135; IRAS, 312, 322, 472; Landsat 4, 303; Large Deployable Reflector, 313; Mutch Memorial Station, 220; night sky from Salyut, 23; orbital transfer vehicle, 493; Pioneer 10 and 11, 507; planetary science plans, 109, 116; plastic mass loss on shuttle, 405; Salyut 7, 401; SIRTIF, 312; space activism, 109; Starlab orbiting telescope, 120; stellar parallaxes by Voyager, 301; Vela 5B, 221
 Stars: associations, 435; Barnard's, 530; *B* stars, 415; formation, 130, 502; low-luminosity, 530; names, 20, 521; starspots, 132
 Sun: solar winds, 397; white-light flares, 226
 Supernovae: Crab remnant, 26, 504; current ideas, 496; historical remnants, 223; in LMC, 224
 Telescopes and telescope making: amateur computer-control of, 548, 552; amateur solar, 81; chronograph, 369; correcting the eye's astigmatism, 465; drive for astrophotography, 366; equatorial tracking with a Dobsonian, 85; monster mirrors, 495; Mount Wilson interferometers, 486; Mount Wilson 60-foot solar, 453; remote operation of, 310; resolution criteria, 176; Sacramento Peak solar spar, 227; Schupmann refractor, 273; 6-inch wooden refractor, 73; 6.4-inch Fauth, 486; 8-inch Fitz, 205; 9½-inch Warner & Swasey, 361; 36-inch Crossley, 301; 74-inch Egyptian, 168; 2.1-meter Kitt Peak, 311; 3.8-meter UKIRT, 310; 4.2-meter William Herschel, 311
 Ultraviolet astronomy: of A0538-66, 498; of Uranus, 11; of variable stars, 413
 Uranus: bright in ultraviolet, 11; infrared views, 112; perturbed by galactic center? 5, 203
 Variable stars: Algol systems, 414; new *AAVSO Report*, 407; new type, 506; nova discovered by Problom, 324; Nova Muscae 1983, 562; ultraviolet observations of, 413; W Serpentis systems, 414; VY Aquarii, 407; UX Arietis, 132; U Cephei, 413; FK Comae Berenices, 323; R Leonis, 252; Alpha Orionis, 156; Beta Persei, 416; RR Pictoris (Nova 1925), 225; CP Puppis, 408; CK Vulpeculae (Nova 1670), 12
 Venus: transits, 405